

# LEAN into Pharmacy Process Improvement

## Six Sigma/LEAN Tools for Everyday Use

Zahra Khudeira, PharmD, BCPS, CPPS - Medication Safety Officer  
 Kristi Stice, PharmD BCPS - Director of Pharmacy

The speakers have no conflicts of interest to disclose

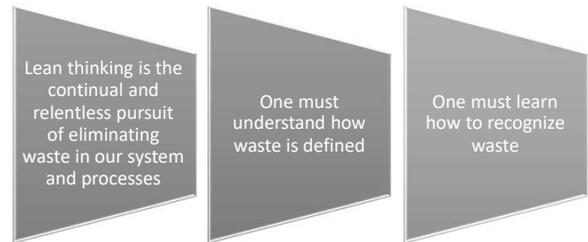
### Objectives

- 1 •Distinguish between Lean and Six Sigma
- 2 •Describe the Define, Measure, Analyze, Improve, and Control (DMAIC) process
- 3 •Discuss the Lean and Six Sigma tools to pharmacy related projects

## Lean – Pursuing a Perfect Process

Kristi Stice, PharmD, BCPS  
 Green Belt Certified in Lean Six Sigma  
 Director of Pharmacy

### What Does LEAN Mean?



### Waste

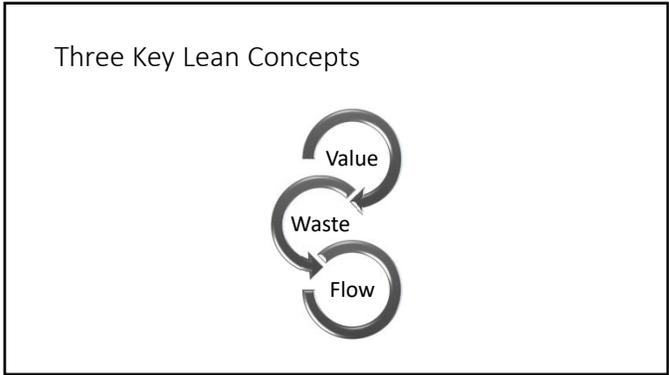
- Synonymous with non-value-added.
- Anything that does not add value to the final product or service for the customer or patient.
- An activity the customer would not want to pay for if they knew it was happening.
- Any activity that takes time, resources, or space, but does not add value to a product or service.
- Lean Waste Acronym = DOWNTIME

### DOWNTIME = Waste

Defects	Errors, duplicate work, checking, inspection, incomplete/incorrect information.
Overproduction	Preparing more than necessary or preparing too much
Waiting	People (patients or workers) waiting for something to arrive/happen
Non-Utilized Talent	People not being consulted for improvement ideas. Not getting the most out of the individual.
Transportation	Moving materials or people
Inventory	Work waiting, patients waiting, batching (waiting to be worked)
Motion	Inefficient workstation design or unnecessary human movement
Excessive Processing	Inefficient processes that use more steps than are actually required for the desired outcome.

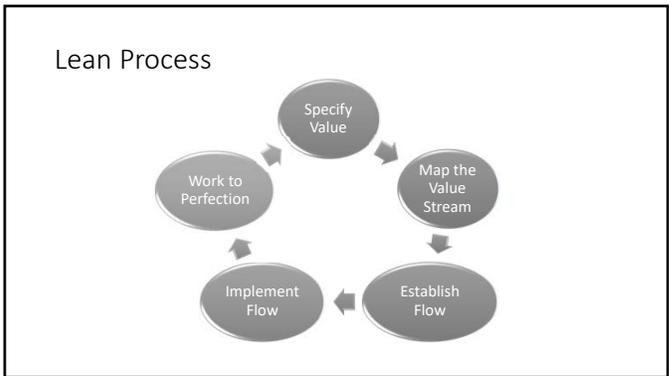
### How Do You Find Waste?

You can not find what you are not looking for!	You need to see it with your own eyes!	You can not do it all alone!	You have to commit!
You have to establish, measure, and compare metrics to determine baseline and gap	Go to the workplace with open-mind and open-eyes to see the processes for yourself	Engage your employees through learning, empowerment, and support to identify and improve	Reducing waste is like accumulating interest, a little over a long time, but you have to start



### Lean Process

Specify Value	Define value from the customers perspective and express value in terms of a specific product or service
Map the Value Stream	Map all of the steps, value-added and non-value-added, that bring a product or service to the customer
Establish Flow	The continuous movement of products, services and information from end to end through the process
Implement Pull	Nothing is done by the upstream process until the downstream customer signals the need
Work to Perfection	The complete elimination of waste so all activities create value for the customer



Which of the following is NOT one of the three lean concepts?

- A. Flow
- B. Value
- C. Defects
- D. Waste

### Six Sigma – A Prescription for Change

Zahra Khudeira, PharmD, BCPS, CPPS  
 Green Belt Certified in Lean Six Sigma  
 Medication Safety Officer

### What Does Six Sigma Mean?

- The term “Sigma” is a measurement of how far a process deviates from perfection – a measure of the number of “defects”
- A quality improvement methodology that applies statistics to measure and reduce variation in processes

### What Does Six Sigma Mean?

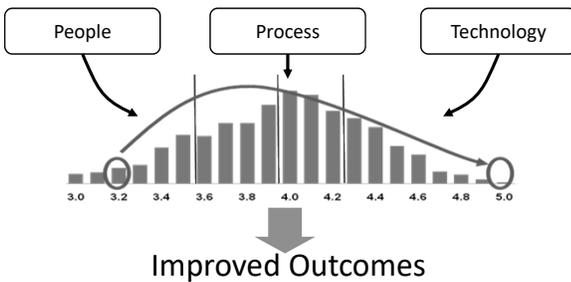
Sigma Level	Defects Per Million Opportunities
2	308,537
3	66,807
4	6,210
5	233
6	3.4

### Six Sigma Goals

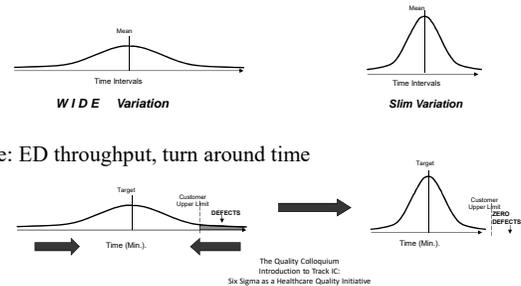
- Improve business performance and customer satisfaction using data
- Customer and financially focused
- Reduce non-value added steps
- Eliminate waste and variation
- Helps prevent jumping to conclusions and having to further optimize a process

### The Sand in the Machine

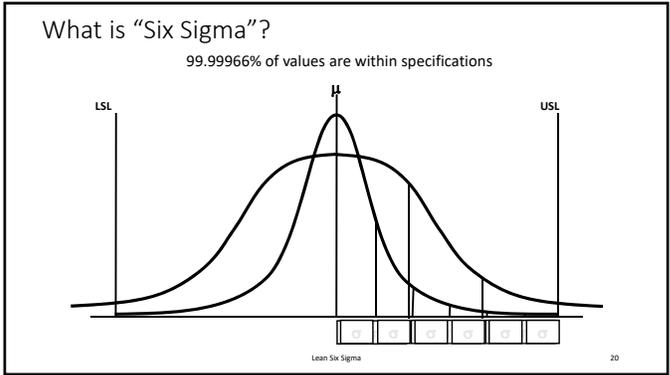
### What is Six Sigma?



### Variation



So ... what's a "sigma" and why do I need six of them?

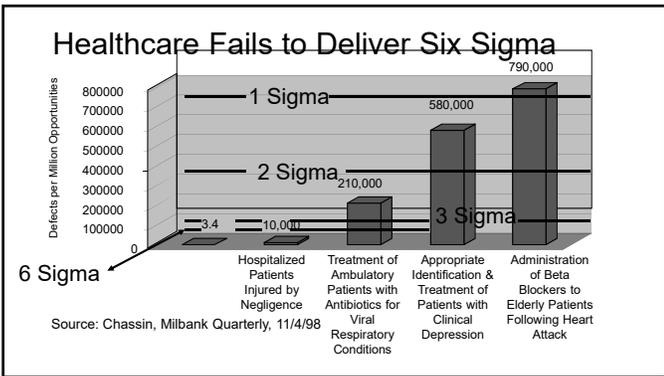
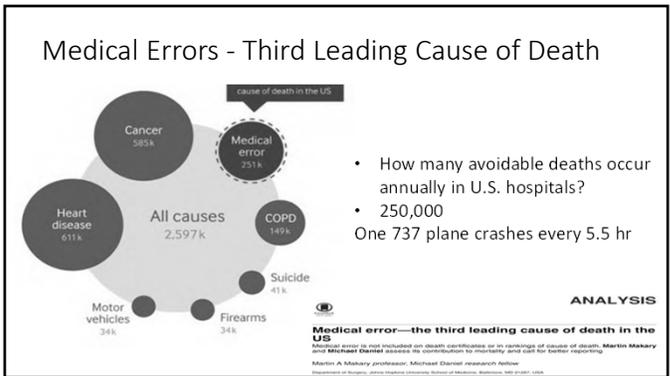


### Six Sigma as a Quality Goal

- The higher the sigma, the fewer the defects
- An increase from 3 to 6 Sigma represents a 20,000 fold improvement in quality

$\sigma$	Defects Per Million Opportunities
1	697,672.15
2	308,770.21
3	66,810.63
4	6,209.70
5	232.67
6	3.40

Measure	3 Sigma (93.3193% Accurate)	4 Sigma (99.379% Accurate)	5 Sigma (99.9767% Accurate)	6 Sigma (99.99966% Accurate)
Wrong prescriptions filled annually	1,336,000	124,200	4,660	68
Incorrect surgical operation weekly	33,400	3,100	117	1.7



The purpose of Six Sigma is to reduce variation in a process

A. True  
 B. False

## Lean and Six Sigma

### Lean and Six Sigma

Lean and Six Sigma are focused on continuous improvement of the system.

#### Lean

- Eliminate waste
- Achieve flow and pull

#### Six Sigma

- Eliminate defects
- Reduce variation in processes

Copyright 2008 Health Administration Press. All rights reserved.

9-26

### Which to use – Six Sigma vs. Lean?

- Lean = Getting a process under control /removing waste
- Six Sigma = decreasing the variation/defects in the process
- THEY ACTUALLY WORK TOGETHER!

## Applications of Lean and Six Sigma

### Boiling Frog

- The boiling frog story is a widespread anecdote describing a frog slowly being boiled alive. The premise is that if a frog is placed in boiling water, it will jump out, but if it is placed in cold water that is slowly heated, it will not perceive the danger and will be cooked to death.

### Sacred Cows

- Something that is regarded by some people with such respect and veneration that they do not like it being criticized by anyone in any way.
- The figurative use of the term 'sacred cow', to refer to a project or process that is immune from tampering, is American in origin and also dates from the late 19th century.

Frogs and Cows

Is there a Boiling Frog in your Department?

Is there a Sacred Cow in your Department?

## Applying Lean

A-3 mapping: A Lean Tool to Minimize Waste

### What is A3 mapping?

- A-3 is PAPER SIZE (11 X 17)
- It is standard work for problem solving
- Provides a standard structure to be able to ask good questions
- Allows everyone to talk about a problem in a focused way
- Leads to effective problem solving based on facts
- Encourages front-line engagement

### A3 Map Structure – uses PDCA

Problem Statement:	Future State
Background:	Countermeasures/Action Plan:
Current Conditions:	
Root Cause Analysis:	
	Results, Metrics:
	Follow up:

*Note: A large 'Plan' label is overlaid on the left side of the table, encompassing the first four rows.*

### Putting the A3 map to work at DMH

Our Story

### Problem Statement/Background

**Problem statement:**

- A good / concise description of what the report is about

**Background:**

- What are you talking about and why
- What is the strategic, operational, historical or organizational context of the situation?

### Problem Statement/Background

**Problem statement:**

- OB is missing medication charges

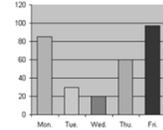
**Background:**

- In OB, medications are charged upon scan/MAR administration
- Anesthesia is giving administering these medications
- They remove them pre-procedure from OB's Omnicell
- In OR, medications are charged on dispense from Omnicell
- Historically, the head of anesthesia has refused to make his staff scan

### Current Condition

**Current Condition:**

- Where do we stand NOW?
- Diagram how the work happens (VSM or process flow)
- Identify the waste, defects and problems in storm clouds.
- May also want to use charts or graphs.



### Current Condition

**Current Condition:** Diagram how the work happens and identify the waste, defects and problems.



### Goal/Target:

- **What specific outcome or improvement in performance do you need to achieve?**
- Show how much by when
- Charges for medications are captured 99% of the time by end of month

### Problem Analysis

**Problem Analysis:**

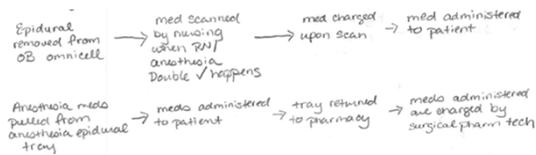
- **Why does the problem exist?**
- For each problem/unwanted variation determine the root cause
- Ask the 5 why's

### Problem Analysis

- Why is the charge lost?
  - The medication isn't charted on the MAR (OB is charge on administration)
- Why isn't the medication charted on the MAR?
  - OB nurses will not chart/scan a medication they are not giving
  - Anesthesia doesn't scan
- Why doesn't anesthesia scan?
  - They chart on paper
- Why do they chart on paper?
  - That's a whole new A3 map!

## Target Condition/Future State

- Create a graphic of the proposed better way to do the work to achieve the goal.



## Countermeasures/Action Plan

### Countermeasures:

- **What needs to happen to move from Current State to Future State?**
- Create one or more countermeasures that state **WHAT** will need to change.
- The counter measures must address root causes identified in the analysis

### Action Plan:

- **How will you implement. 3 W's**
- Focus on the **HOW** to get to the what listed in the counter measure(s).
- What actions will be taken and in what sequence to achieve the counter measures?
- Who will be responsible for what by when

## Countermeasures/Action Plan

### Countermeasures: What

- Re-configure anesthesia epidural tray
- Remove anesthesia meds from OB Omnicell
- Educate involved staff on new process

### Action Plan: How

- Pam and Sue go through checklist of meds and tray arrangement
- Mark remove fentanyl and bupivacaine from OB Omnicell
- Sue G send an e-mail to anesthesia staff and post notice on communication board

## Metrics/Follow-up

### Metrics

- **Cost / Benefit:**
- Implementation costs
- What was the old cost? What is the new cost? Can a savings be calculated?
- **TEST:** How will you measure the effectiveness of the action plan?
- **Results:** What are the results?
- **Follow Up:**
- How will you know that the actions have the desired impact?
- How will you know you know targets are being met?
- How will you ensure and sustain success?
- How will you share your learning and success with others?

## A3 Mapping: Driving it home

- A3 map is simply a tool
- Helps you focus on the process & root cause vs. just trying to "fix it"
- Gets people talking about the real cause of the problem
- Can be used by any level staff member
- You **MUST** go to the Gemba (where the work takes place)
- Use pencil – it's always a work in progress!

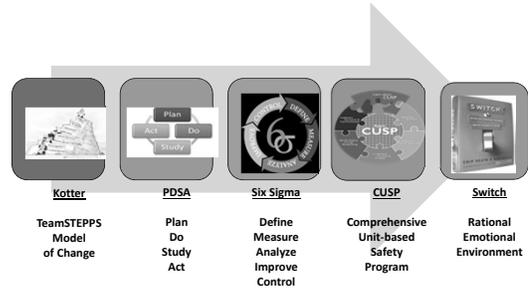
## Which of the following statements about A3 maps is NOT true?

- They help you to determine the root cause of the issue
- They should be completed by one person to avoid bias
- They follow PDCA (Plan, Do, Check, Act) methodology
- They show you the current flow and future flow options all in one document

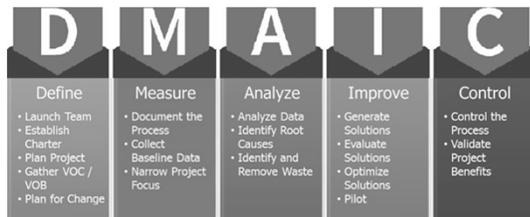
## Applying Six Sigma



## Hospital Initiatives



## DMAIC Drives Six Sigma Process



## Six Sigma Project Ideas

- Improve patient throughput in radiology
- Improve time to first appointment
- Improve OR case cart accuracy
- Improve staff recruitment and retention
- Improve process/safety for medication administration
- Reduce blood stream infections in ICU
- Reduce ventilator acquired pneumonia
- Shorten stroke patient length of stay
- Reduce number of inpatient transfers
- Reduce emergency department patient wait time

Six Sigma is not about projects – projects are a means to an end! It's about better patient care!

The Quality Colloquium  
Introduction to Track IC:  
Six Sigma as a Healthcare Quality Initiative

## Why Zero Defects is the Only Acceptable Quality Standard

- At 99.9% quality levels in a 250 bed hospital
  - 12 inpatients would die due to errors annually
  - 6 day surgery patients would die
  - 9,742 wrong medications would be delivered
  - 4,923 incorrect laboratory tests would be reported
  - 502 incorrect radiographs would be completed

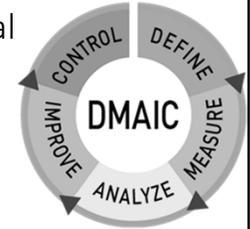
What is the defect per million opportunities if we have an error rate of 5% for a process:

- A. 10,000
- B. 5,000
- C. 50,000
- D. 10,000

### Questions to Consider for Your Site

- How can stable processes improve service for our patients and customers?
- Do you think we have waste and inefficiencies? Where?
- Do you think there is opportunity to improve patient satisfaction?
- What kind of processes do we have that are costly to hospital?

### Medication Reconciliation Lean Six Sigma Project Mount Sinai Hospital



### Define

**Problem Statement:**

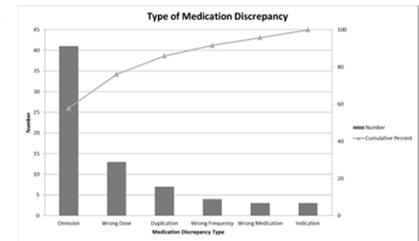
•Data from a random selection of patients at Mount Sinai Hospital from January 1, 2015-April 20, 2015 reveals that 12.4% (48/387) of medication discrepancies were identified by pharmacists, resulting in reduced readmissions and patient harm.

**Goal Statement:**

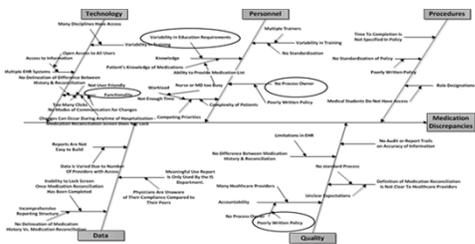
•Increase the proportion of medication discrepancies identified and corrected by more than 50% during the inpatient visit from 12.4% to 25% by July 2016 on the general medicine unit, 6 North

### Measure

- The few vital types of discrepancies identified by pharmacy were:
  - Omission of medications
  - Wrong doses
- Other discrepancies included duplication of drug therapy and the wrong frequency of medications.



### Analyze



### Improve

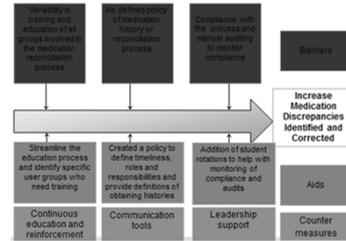
- The medication reconciliation policy was updated to define roles and responsibilities and expectations.
- Competencies were uploaded for physicians, nurses and pharmacists.
- Medications are now organized by therapeutic class instead of alphabetical order. This allows the physician to identify duplications in therapy on admission.

### Improve

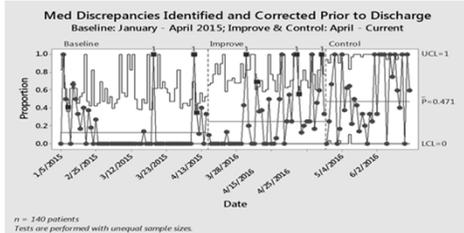
No conflict checking is provided for [ ] medications.

Medications/Equipment	Orders/Referrals	All	Conc	Cont	Stop	Renew	Enc
<b>Home Medications (6)</b>							
<b>Cardiovascular Drugs</b>							
Metoprolol Succinate (XL)* (Loprol XL*) 50 MG TAB	09/28/13	Reported					
50 MG PB BBLV							
<b>Eye, Ear, Nose and Throat (EEN)</b>							
Borzoinide Hydrochloride/11 (Cosopt PF Eye Drops)	04/06/16	Reported					
1 DROP EACH EYE BID							
Latanoprost 0.005% Opth Soln* (Xalatan*) 2.5 ML O	09/28/13	Reported					
1 GTT RIGHT EYE QPM							
<b>Urinary</b>							
Folic Acid* (Folvite*) 1 MG TAB	09/23/13	Ref #					
1 MG PB BBLV 30 Bags							
Ullatam (S*) (Ullatam (S*)) 400 MG TABLET	04/06/16	Reported					
400 MG PB BBLV							
<b>Other</b>							
Amiodipine Besilate (Amiodipine) 5 MG TAB	09/28/13	Reported					

### Improve



### Control



Only 12.4% of medication discrepancies were identified and corrected during the baseline period. Currently, 47.1% of medication discrepancies are identified and corrected, which is above the target of 25%. There were no medication duplication discrepancies after the Improve stage of the DMAIC process.

### Cost of Poor Quality (COPQ)

	Baseline	Results	Goal
COPQ	\$138,915	\$48,900	\$69,457
Relevant Metric	12.4%	47.1%	25.0%
PPM (of DPMO)	875,283	528,345	748,299
Sigma Level	0.35	1.13	0.83

COPQ: 6N would have an annualized cost avoidance of \$138,915 if pharmacy completed medication histories on all patients. Cost of one lawsuit in recent years due to ADE's related to medication reconciliation discrepancies have resulted in approximately \$65,000 in legal fees only

### Goals of Six Sigma

**Improve Performance**



- Reduce defects
- Stabilize processes
- Patient satisfaction

**Reduce Costs**



- Improve efficiency
- Eliminate waste
- Reduce cost of poor quality

### Conclusion

Six Sigma is a:

- Quality improvement methodology that applies statistics to measure and reduce variation in processes

In the DMAIC process, one can go to the Analyze phase before completing the Measure phase.

- A. True
- B. False

## Lean into Pharmacy Process Improvement-

Lean tools/Six Sigma for everyday use

Kristi Stice, PharmD BCPS - Director of Pharmacy  
Zahra Khudeira, PharmD, BCPS, CPPS - Medication Safety Officer